Assembly for connecting a wheel to a vehicle axle.

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DE2243331 (A1)
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Abstract of **EP 0418532 (A1)**

An assembly (1) for connecting a wheel (2) to an industrial vehicle axle (3), comprising a support unit (10) provided with two rows of taper rollers and having an inner ring (11) axially locked on the axle (3) and an outer ring (12) which integrally defines a phonic wheel (45) for measuring the velocity of the wheel (2); the wheel (2) is to be fixed to brake drum (20) directly mounted on the outer ring (12) of the support unit (10).

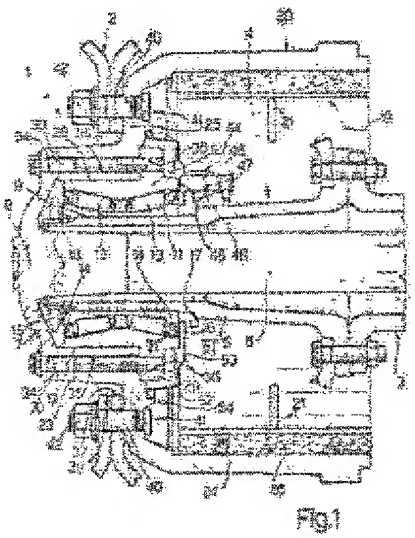

Fig.1

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(54) Assembly for connecting a wheel to a vehicle axle.

(57) An assembly (1) for connecting a wheel (2) to an industrial vehicle axle (3), comprising a support unit (10) provided with two rows of taper rollers and having an inner ring (11) axially locked on the axle (3) and an outer ring (12) which integrally defines a phonic wheel (45) for measuring the velocity of the wheel (2); the wheel (2) is to be fixed to brake drum (20) directly mounted on the outer ring (12) of the support unit (10).

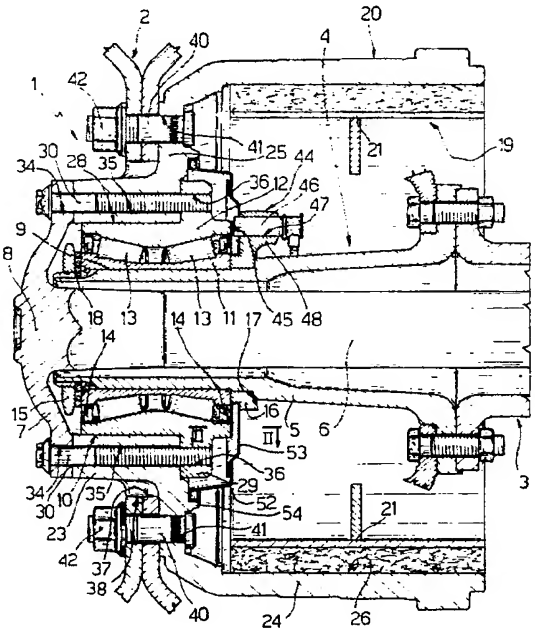

Fig.1

EP 0 418 532 A1

ASSEMBLY FOR CONNECTING A WHEEL TO A VEHICLE AXLE

This invention relates to an assembly for connecting a wheel to the axle of a vehicle, particularly an industrial vehicle.

In this respect, in the present description and claims the term "axle" is to be taken in its widest sense without any limit on the arrangement of the axle in the vehicle and independently of whether the axle concerned is a live axle or not.

Assemblies for connecting a wheel to a vehicle axle are known, comprising a hub and a pair of bearings, generally of the taper roller type, which support the hub radially and axially to the axle. The wheel and its brake drum are connected to the radial flange of the hub by a plurality of bolts.

Said connection assemblies are also frequently provided with a device for measuring the wheel velocity, this being associated with a braking control device to prevent wheel locking. This measurement device comprises a phonic wheel fixed to the inside of the hub, and a sensor facing the phonic wheel and fixed in a projecting manner to a support welded to the axle.

The mounting assemblies of this briefly described type have certain drawbacks.

Firstly, such assemblies comprise a large number of components and are therefore rather costly and are lengthy to mount and set.

In this respect, the axial bearing clearance has to be set, and this setting has to be repeated each time the assembly is removed, for example to replace or overhaul the drum.

The object of the present invention is to provide an assembly for connecting a wheel to an industrial vehicle axle, which is free of the aforesaid drawbacks connected with known assemblies.

Said object is attained according to the present invention by an assembly for connecting a wheel to an industrial vehicle axle, of the type comprising wheel support means interposed between said axle and said wheel, a drum brake the drum of which is rigid with said wheel, and a velocity measurement device comprising a phonic wheel angularly rigid with said wheel and a sensor fixed facing said phonic wheel, characterised in that said support means comprise a support unit consisting of an inner ring mounted on said axle, an outer ring integrally defining said phonic wheel, and a plurality of rolling bodies interposed between said inner and outer rings, said drum being mounted directly on said outer ring of said support unit, said assembly comprising means for fixing said wheel to said drum.

The present invention will be more apparent from the description of a preferred embodiment thereof given hereinafter with reference to the accompanying drawings in which:

Figure 1 is an axial section through an assembly for connecting a wheel to a live axle of an industrial vehicle; and

Figure 2 is a section on the line II-II of Figure 1 to an enlarged scale.

In Figure 1 the reference numeral 1 indicates overall an assembly for connecting a partly shown wheel 2 to an industrial vehicle live axle 3, of which a lateral end portion 4 is shown.

Said portion 4 of the axle 3 comprises a tubular sleeve 5 and an axle shaft 6 housed angularly free within the sleeve 5 and integrally provided with a drive flange 7 extending radially from an end 8 of the axle shaft 6, this end projecting axially outwards from the sleeve 5.

In proximity to its outer end the sleeve 5 comprises a cylindrical portion 9 on which a support unit 10 is mounted. The unit 10 comprises an inner ring 11, an outer ring 11 coaxial therewith, and two rows of taper rollers 13 interposed between said rings 11, 12. The unit 10 is of the sealed type by virtue of a pair of lateral gaskets 14, with lifelong grease lubrication.

The inner ring 11 of the unit 10 is locked axially on the sleeve 5 by a ring nut 15 which clamps it against a spacer ring 16, which abuts axially against a shoulder 17 of the sleeve.

An anti-slackening washer of conventional type is interposed between the ring nut 15 and ring 11.

The connection assembly 1 also comprises a drum brake 19, of which the drum 20 and part of the brake shoes 21 are visible in Figure 1. The drum 20 is substantially of bell shape and comprises a first tubular portion 23 and a second tubular portion 24, both substantially cylindrical and of smaller and larger diameter respectively, and a flat annular wall 25 which joins them integrally together.

The portion 24 houses the brake shoes 12 and has an inner cylindrical surface 26 with which the brake shoes cooperate during braking.

According to the present invention the portion 23 of the drum 20 is mounted directly on the outer ring 12 of the support unit 10, which is provided for this purpose with an outer cylindrical surface 28 for centering the drum, and an annular flange 29, this latter in proximity to that end facing the interior of the vehicle. Specifically, the portion 23 of the drum 20 is contained axially between the flange 29 and the drive flange 7 of the axle shaft 6, to which flanges it is connected by a plurality of angularly equidistant screws 30 passing through axial holes 34, 35 in the drive flange 7 and portion 23 respectively, and screwed into corresponding threaded

holes 36 in the flange 29 of the outer ring 12.

The wheel 2, provided with a central hole 37 to be engaged by a centering surface 38 provided on the portion 23 of the drum 20, is fixed against the wall 25 of the drum 20 by a plurality of bolts passing through respective holes in said wall 25, and respective nuts 42.

Finally, the assembly 1 comprises a device for measuring the velocity of the wheel 2, indicated overall by 44, to be connected to a conventional braking control device, not shown, for preventing wheel locking and corresponding skidding. The device 44 comprises a phonic wheel 45 formed on and integral with the front face of the outer ring 12 of the support unit 10, and a magnetic sensor 46 housed in an axial seat provided in a substantially radial appendix 48 of the spacer ring 16 and facing the phonic wheel 45. As is clearly shown in Figure 2, the phonic wheel 45 consists of a plurality of frontal teeth 50 of the ring 12, they being angularly equidistant from each other and conveniently embedded in a layer of applied plastics material 51. The layer 51 does not influence the magnetic characteristics of the phonic wheel 45, but prevents accumulation of dirt particles between the teeth which, in time, could disturb the reading of the sensor 46.

Finally, the assembly 1 comprises a pair of substantially annular protection plates 52, 53 mounted within an annular projection 54 on the inside of the drum wall 25 and on the spacer ring 16 respectively, with their respectively inner and outer edges facing each other axially.

The operation of the assembly is as follows.

The motion of the axle shaft 6 is transmitted by the flange 7 to the drum 20 (and hence to the wheel 2 connected to it) and to the outer ring 12 of the support unit 10. In known manner, the sensor 46 measures the rotational velocity of the phonic wheel 45, which is equal to that of the wheel 2.

The resultant advantages of the assembly 1 are apparent from an examination of its characteristics.

Firstly, for equal operability, the number of components is smaller than in the case of conventional constructions because the outer ring 12 of the support unit 10 also acts as the wheel hub and incorporates the phonic wheel.

Furthermore, the assembly 1 is particularly rapid and simple to mount and maintain, as no adjustment of the support unit 10 is required, it being simply bolted on, whereas the conventional two-bearing construction requires precise clearance adjustment.

Again, removing the drum does not require removal of the support unit 10, as instead is required in the case of conventional bearings.

Finally, mounting the sensor 56 in a radial appendix of the ring 16 is particularly advantageous, because it does not require support elements to be welded to the sleeve 5 and the sensor 46 does not undergo vibration during operation.

Finally, it is apparent that modifications can be made to the described assembly, but without leaving the scope of protection of the present invention.

Claims

1. An assembly for connecting a wheel to an industrial vehicle axle, of the type comprising wheel support means interposed between said axle and said wheel, a drum brake the drum of which is rigid with said wheel, and a velocity measurement device comprising a phonic wheel angularly rigid with said wheel and a fixed sensor facing said phonic wheel, characterised in that said support means comprise a support unit (10) consisting of an inner ring (11) mounted on said axle (3), an outer ring (12) integrally defining said phonic wheel (45), and a plurality of rolling bodies (13) interposed between said inner and outer rings (11, 12), said drum (20) being mounted directly on said outer ring (12) of said support unit (10), said assembly (1) comprising means for fixing said wheel (2) to said drum (20).

2. An assembly as claimed in claim 1, characterised in that said axle is an industrial vehicle live axle (3) comprising a fixed outer sleeve (5) and an axle shaft (6) housed in said sleeve (5) and provided with an end drive flange (7); said inner ring (11) of said support unit (10) being axially locked on said sleeve (5), said outer ring (12) being connected angularly rigid to said drive flange (7) and to said drum (20).

3. An assembly as claimed in claim 2, characterised in that said outer ring (12) comprises a cylindrical surface (28) for centering said drum (20) and a radial flange (29); said drum (20) comprising a first tubular portion (23) mounted on said cylindrical centering surface (28), said first tubular portion (23) being axially interposed between said drive flange (7) of said axle shaft (6) and said flange (29) of said outer ring (12), and connected to and angularly rigid with said flanges (7, 29).

4. An assembly as claimed in one of the preceding claims, characterised in that said sensor (46) is housed in a radial appendix (48) of a spacer ring (16) axially interposed between said inner ring (11) of said support unit (10) and a shoulder (17) of said sleeve (5).

5. An assembly as claimed in one of the preceding claims, characterised in that said phonic wheel (45) consists of a plurality of angularly equidistant frontal teeth (50) of said outer ring (12) of said support unit (10).

6. An assembly as claimed in claim 5, characterised in that said teeth (50) are embedded in a layer of plastics material (51).

7. An assembly as claimed in any one of the preceding claims, characterised in that said drum (20) comprises a second tubular portion (24) defining internally a cylindrical braking surface (26), and a substantially flat annular wall (25) which joins said first and second tubular portion (23, 24) together, said means for connecting said wheel (2) to said drum (20) comprising a plurality of screws (40) housed in respective axial holes (41) in said annular wall (25) of said drum (20).

8. An assembly as clai:ed in rny one of the preceding clai:s, characterised in that said rolling bodies of said support unit are two rows of taper rollers (13).

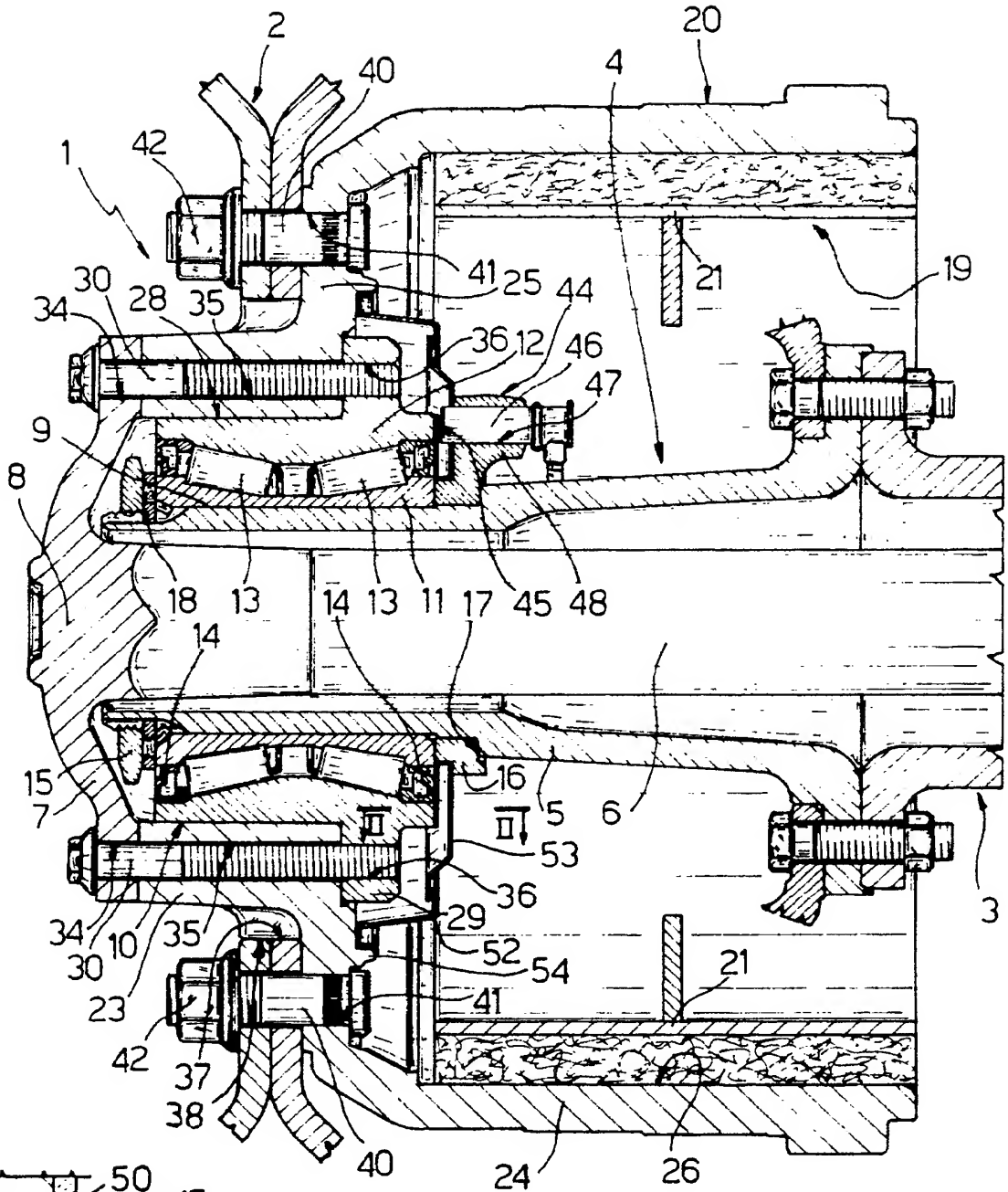
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Fig.1

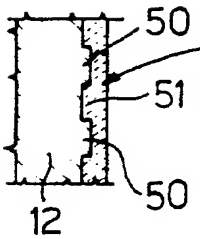
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Fig.2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 11 5075

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	WO-A-8 602 607 (ZAHNRADFABRIK FRIEDRICHSHAFEN) * page 3, line 14 - page 4, line 12; figure 1 *	1,2,3,5,7, 8	B 60 B 27/00 G 01 P 3/48
Y	WO-A-8 700 290 (SAAB-SCANIA) * page 2, line 28 - page 3, line 19; figure 1 *	1,2,3,5,7, 8	
A	DE-A-2 243 331 (TELDIX) * page 5, lines 19 - 35; figure 1 *	1,5,8	
A	EP-A-0 306 850 (OTTO SAUER) * column 4, lines 6 - 31; figure 1 *	1,5	
A	DE-A-3 703 395 (PORSCHE) * column 2, line 57 - column 3, line 14; figures 1-3 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 60 B
G 01 P

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	14 December 90	AYITER I.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
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P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

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